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UNIVERSAL HEAT SINK RETENTION MODULE FRAME

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Background

[0001] The present disclosure relates generally to information handling systems, and more particularly to a heat sink retention frame.

[0002] As the value and use of information continues to increase, individuals and businesses seek additional ways to process and store information. One option available to users is information handling systems. An information handling system generally processes, compiles, stores, and/or communicates information or data for business, personal, or other purposes thereby allowing users to take advantage of the value of the information. Because technology and information handling needs and requirements vary between different users or applications, information handling systems may also vary regarding what information is handled, how the information is handled, how much information is processed, stored, or communicated, and how quickly and efficiently the information may be processed, stored, or communicated. The variations in information handling systems allow for information handling systems to be general or configured for a specific user or specific use such as financial transaction processing, airline reservations, enterprise data storage, or global communications. In addition, information handling systems may include a variety of hardware and software components that may be configured to process,

store, and communicate information and may include one or more computer systems, data storage systems, and networking systems.

[0003] Many information handling systems include heat sink retention frames in order to secure heat sinks to parts of the system that need cooling, typically processors. These frames are limited for use on different processing platforms for a number of reasons. Due to their set widths and lengths, the size of the heat sink base that can be used on the platform is restricted. This can result in the use of less than optimal heat sinks, and in turn, less than optimal thermal dissipation.

[0004] These frames often sit adjacent the processors in the information handling system. This results in a limitation on the available positioning of the frame and the heat sink, which can result in less than optimal placement of the cooling fans.

[0005] The frames generally have a larger area in contact with the circuit board than is necessary, which limits their use and orientation due to interference with components on the board. Structures in which the frame extends over the circuit board increase the height of the frame, which can result in less than optimal placement of the cooling fans.

[0006] The heat sink retention clips used with these retention frames are restricted to orientation in one direction which restricts orientation of the heat sink frame due to interference between the retention clips and the processor. In addition, the restricted orientation of the clips can result in less than optimal placement of the cooling fans due to the height of the retention clips.

[0007] Accordingly, it would be desirable to provide a improved heat sink retention frame in an information handling system absent the disadvantages found in the methods discussed above.

Summary

[0008] According to one embodiment, a heat sink retention frame is disclosed which includes a plurality of base members mounted on a board member. A plurality of retention members are provided, with each retention member having a first end moveably connected to a first connector portion of one of the base members, and having a second end extended into connection with a second connector portion of another of the base members.

[0009] A principal advantage of this embodiment is that it lends itself for re-use on different processor platforms. Individual base members may be mounted on the board member with the appropriate spacing to allow use of the optimal size heat sink for a given thermal solution. Individual retention members may be re-oriented about the frame, allowing the frame to be adjusted for different platforms or changes in a particular platform.

Brief Description of the Drawings

[0010] Fig. 1 is a diagrammatic view illustrating an embodiment of an information handling system.

[0011] Fig. 2 and 3 are perspective views illustrating an embodiment of a base member.

[0012] Fig. 4 is a perspective view illustrating an embodiment of a retention member.

[0013] Fig. 5 is a perspective view illustrating an embodiment of a heat sink.

[0014] Fig. 6 is a perspective view illustrating an embodiment of a board member with a pair of processors on the board member and a heat sink retention frame mounted on the board member for use with one of the processors.

[0015] Fig. 7 is a perspective view illustrating a heat sink connected to a heat sink retention frame.

Detailed Description

[0016] For purposes of this disclosure, an information handling system may include any instrumentality or aggregate of instrumentalities operable to compute, classify, process, transmit, receive, retrieve, originate, switch, store, display, manifest, detect, record, reproduce, handle, or utilize any form of information, intelligence, or data for business, scientific, control, or other purposes. For example, an information handling system may be a personal computer, a network storage device, or any other suitable device and may vary in size, shape, performance, functionality, and price. The information handling system may include random access memory (RAM), one or more processing resources such as a central processing unit (CPU) or hardware or software control logic, ROM, and/or other types of nonvolatile memory. Additional components of the information handling system may include one or more disk drives, one or more network ports for communicating with external devices as well as various input and output (I/O) devices, such as a keyboard, a mouse, and a video display. The information handling system may also include one or more buses operable to transmit communications between the various hardware components.

[0017] In one embodiment, information handling system 10, Fig. 1, includes a microprocessor 12, which is connected to a bus 14. Bus 14 serves as a connection between microprocessor 12 and other components of computer system 10. An input

device 16 is coupled to microprocessor 12 to provide input to microprocessor 12. Examples of input devices include keyboards, touchscreens, and pointing devices such as mouses, trackballs and trackpads. Programs and data are stored on a mass storage device 18, which is coupled to microprocessor 12. Mass storage devices include such devices as hard disks, optical disks, magneto-optical drives, floppy drives and the like. Computer system 10 further includes a display 20, which is coupled to microprocessor 12 by a video controller 22. A system memory 24 is coupled to microprocessor 12 to provide the microprocessor with fast storage to facilitate execution of computer programs by microprocessor 12. It should be understood that other busses and intermediate circuits can be deployed between the components described above and microprocessor 12 to facilitate interconnection between the components and the microprocessor.

[0018] A base member 26, FIG. 2 and 3, is one of a plurality of identical base members discussed below. Base member 26 includes a first connector portion 28 with a first connection axis 30. First connector portion 28 includes a pivotal connection 32 spaced apart from a guide surface 34 to create a channel 36. Base member 26 also includes a second connector portion 38 with a second connection axis 40. Second connector portion 38 is oriented substantially perpendicular to first connector portion 28 and includes opening 42 and latch connection 44. A board mounting member 46, further described below, extends from base member 26.

[0019] A retention member 48, FIG. 4, is one of a plurality of retention members discussed below. Retention member 48 includes a first connection end 50 and a second connection end 56. First connection end 50 includes a hinge member 52 and a channel member 54. Hinge member 52 is collinear with first connection axis 30 such that retention member 48 may pivot about first connection axis 30 by hinge member 52. Second connection end 56 is at an opposite end of retention member 48 from first connection end 50. A handle 58 is located along the length of the

retention member 48, adjacent to second end 56. A heat sink contact 60 is located between first connection end 50 and second connection end 56.

[0020] A heat sink 62, FIG. 5, includes a finned heat sink body 63 having a heat sink base 64. A retention member contact surface 66 extends from heat sink base 64.

[0021] A board member 68, which is included in a chassis (not shown), FIG. 6 and 7, includes a processor socket 70 mounted on board member 68. The processor socket 70 allows microprocessor 12 to be mated to board member 68 in order to connect it with other components attached to board member 68. Processor socket 70 includes a processor socket release latch 72 which is used to disconnect and release microprocessor 12 from processor socket 70 once the two have been mated.

[0022] Multiple base members 26a, 26b, 26c, and 26d are mounted on board member 68 by inserting board mounting member 46 through a receiver or aperture (not shown) in the board member 68. The mounting position of base members 26 will depend on the size of a heat sink base 64 on a heat sink 62 that is needed to cool microprocessor 12. The orientation of microprocessor 12 and hence processor socket 70 and processor socket release latch 72 also dictates the mounting position of base members 26, as shown in FIG. 6. Base member 26c and base member 26d are spaced apart to allow processor socket release latch 72 to be positioned between them. Adjacent base members 26a, 26b, 26c, and 26d are oriented at about ninety degrees relative to each other and substantially equal distances from each other. Mounting base members 26 substantially equal distances from each other allows the use of identical retention members 48 that may be connected to any adjacent base members 26.

[0023] Retention member 48a has first end 50a pivotally connected to first connector portion 28a on base member 26a. This allows retention member 48a to pivot about first connection axis 30a. In more detail (see FIG. 3, 4, and 5), hinge member 52 on retention member 48 is placed in pivotal connection 32 on base member 26. Channel member 54 on retention member 48 sits in channel 36 on base member 26. Guide surface 34 holds hinge member 52 in pivotal connection 32 during the range of pivotal motion of retention member 48.

[0024] Retention member 48a is in a retaining mode when second connection end 56a is latched, using handle 58a, to second connector portion 38b on base member 26b, with retention member 48a lying along second connection axis 40a. In more detail (see FIG. 3, 4, and 5), second connection end 56 on retention member 48 passes through opening 42 on base member 26 and is engaged with latch 44 to secure second connection end 56 to base member 26.

[0025] The length of retention member 48 is determined by the placement of the base members 26, as retention member 48 must be long enough to connect to two adjacent base members 26. Ideally, all base members 26 will be substantially equal distances apart, allowing use of identical retention members 48, any one being connectable to any two adjacent base members 26.

[0026] In the above described retaining mode, FIG. 7, heat sink contact 60 on retention member 48 engages heat sink base 64 at retention member contact surface 66 and holds heat sink 62 in abutment with microprocessor 12. Handle 58 is used to latch and unlatch second connection end 56 from second connector portion 38 and in turn retain or release heat sink 62. The low profile of base members 26c, 25d and retention member 48 allows other system components, such as cooling fans (not shown), to be placed in the space over them and adjacent to heat sink 62.

[0027] In FIG. 6, retention member 48b connects to base members 26c and 26d in the same manner as retention member 48a, but with opposite orientation. This results in retention members 48a and 48b being substantially parallel to each other. Processor socket release latch 72 sits below retention member 48b in FIG. 6. If increased access to processor socket release latch 72 or a different heat sink 62 orientation is desired, retention member 48a may be connected to base members 26a and 26d, and retention member 48b may be connected to base members 26b and 26c, leaving no retention member 48 above processor socket release latch 72 and allowing the heat sink 62 to be rotated substantially ninety degrees.

[0028] As can be seen, the principle advantages of these embodiments are that a heat sink retention frame is provided that may be used across different system platforms with a number of benefits. The frame is adjustable to accommodate the optimal heat sink size for a given thermal solution, it has a limited area of contact between the frame and the board member which allows more components to be used on the board member, and its components allow multiple orientations of the frame and the heat sink, which allows orientation of the heat sink frame on the board member independent of the orientation chosen for the processor and results in less interference with the processor socket release latch and the cooling fans. The same base members may be spaced according to a desired length of the retention members to accommodate various sizes of heat sinks.

[0029] Although illustrative embodiments have been shown and described, a wide range of modification, change and substitution is contemplated in the foregoing disclosure and in some instances, some features of the embodiments may be employed without a corresponding use of other features. Accordingly, it is appropriate that the appended claims be construed broadly and in a manner consistent with the scope of the embodiments disclosed herein.